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CHINA'S ECO-CIVILIZATION: FROM HISTORY TO POLICY

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ABSTRACT

The modern Chinese public has demonstrated a growing ecological awareness, driven in part by the impact of rapid industrialisation and related pollution trends that have directly undermined societal health and well-being. The PRC government recognizes the real costs of environmental degradation in the face of rising energy needs and societal expectations unleased through the "China Dream" of recent years. The linking of large segments of economic, energy, developmental, social and foreign-relations policy under an integrated rubric had already emerged via earlier "harmonious society" and "harmonious world" doctrines. This approach has gained extended government endorsement under Xi Jinping through 2013–2018. The construction of an Ecological Civilization, first formally taken up from 2007, has now been given the status of a National Development Strategy and has been further embedded in the 13th Five-Year Plan for 2016-2020 and gained extra endorsement in major meetings of the CPC (Chinese Communist Party) and the NPC (National People's Congress) in early 2018. Behind this debate stands the long-term

engagement of Chinese civilization with its environmental and productive base. Renowned as pioneers in irrigation and agricultural expansion, early Chinese states developed philosophies directly supportive of agriculture as the "root" on which the other branches of the society and state were established. The difficulty of maintaining a large peasant (farming) population on the land without excessive human and environmental exploitation, however, became a major dilemma for all imperial dynasties. This tension has found expression today in the challenge of providing food security and rural livelihoods during periods of intensified industrialization and urbanization. This will remain one of the major challenges for a truly Ecological Civilization in the 21st century, whether in China or elsewhere.

Keywords: agriculture, China, ecological civilization, food security, pollution, sustainable development

DANGEROUS ASSUMPTIONS: THE ANTHROPOCENE AND ECO-CIVILIZATION

The idea that major states should take up the mantle of advancing an eco-civilization has gained conceptual traction in the last three decades. This has included serious academic and policy analysis, paralleling the proposal that we are now in an Anthropocene age increasingly shaped by human activity, an idea popularised by the atmospheric chemist and Nobel Prize winner Paul Crutzen, along with his colleague Eugene Stoermer (Crutzen and Schwagerl 2011; Crutzen 2002; Crutzen and Stoermer 2000). This was based on the increasing impact and agency of humans in planetary terms: humans appropriating a substantial share of net biomass primary production (circa 27 - 44% down through 2050 in some estimates), exploiting over 30% of the land surface, the impact of the "Colombian exchange" as diverse species are redistributed across the planet, and the cumulative impact of the industrial revolution on climate change (Krausman et al. 2013; Sachs 2007; Crutzen 2002). Regardless of controversies as to the exact start of this Anthropocene (with the gradual development of agriculture, at the onset of industrial age in the late 18th century, a starting point proposed by Paul Crutzen, or the 'great acceleration' of the post-World War II period), this change in human agency now requires active governance of global eco-

systems and planetary environmental resources (Delanty and Mota 2017; Crutzen 2002). As already noted in an early research note by Paul Crutzen and Eugene Stoermer:

> To develop a world-wide accepted strategy leading to sustainability of ecosystems against human induced stresses will be one of the great future tasks of mankind, requiring intensive research efforts and wise application of the knowledge thus acquired in the noösphere, better known as knowledge or information society. An exciting, but also difficult and daunting task lies ahead of the global research and engineering community to guide mankind towards global, sustainable, environmental management. (Crutzen and Stoermer 2000, 18).

It also suggests a necessary change to instrumental thinking and related social values, leading towards a new cultural and technological base that can grow alongside the Earth's biological diversity rather than depleting or consuming it (Crutzen and Schawgerl 2011). It is these factors that have led to a changed intellectual climate and allowed the push towards implementing and funding the 2015 Paris Climate Change Agreement (even without US support) and the concurrent widespread adoption of the Sustainable Development Goals. For Delanty and Mota (2017, 34) such transitions are best managed by deliberative cosmopolitan political approaches that link the structure of human societies with geopolitical and "planetary boundaries" in which "the human world is re-imagined culturally and politically in terms of its relation with the Earth".

A parallel trend engaged the idea of an Ecological Civilization, based on the proposal of an ecological society and radical democratization, developed by Roy Morrison (Morrison 1995, 11-18; Huan 2016). In a minimal form it has been loosely defined in Western scholarship as sustainable development in the context of a fully modern and industrialized society which emphasizes "green energy, a minimal global-footprint, carbon-free degrowth" and sustained ecological systems (Oswald 2014). In socialist forms it includes the need to restrain unlimited economic growth and capital accumulation, the move towards a more equitable society with modest goals, and the harmonization of production in order to *"maintain biological and habitat diversity" within "a functioning and thriving*

ecosystem" (Magdoff 2012). This nexus of environmental and socialist concerns has also led to a vigorous critique of the capitalist system and its dominant historical narratives and ideas of development, including the role of global corporations and the limited ability of government and IGOs to manage emerging social and environmental crises (Korten 2017). Unfortunately, this movement has been less successful in demonstrating technical and political alternatives that can be adopted and implemented within realistic timeframes. Partial reflections of this concern for resilient ecologies, "circular economies" and sustainable societies are found in current trends within Climate Change negotiations (seeking rapid transition to low-carbon societies) and the Sustainable Development Goals that allow for humane adaptation to ecological constraints (Wilts 2016; UNEP 2016). However, the most explicit governmental mobilisation of the idea of an "eco-civilization" can be found in 21st century policies of the People's Republic of China (see below).

There are some problematic conceptual assumptions in these general formulations. Being an eco-civilization is not a choice. All human societies rely on the environment for their economic, subsistence and resource needs, in turn affecting the ecology in which they are situated. Historical analysis suggests that societal formations at times are shaped directly by their original environmental context or by being situated across ecological boundaries. Thus, the evolution of large civilizational complexes in river basins that can carry agricultural surpluses and high human populations (as in Egypt, Sumeria, diverse Indus civilizations, and across northern China) has been a focus of analysis since Karl Wittfogel's 1957 work on hydraulic civilizations (*Oriental Despotism: A Comparative Study on Total Power*). Likewise, the interaction of nomad communities with state formation across stressed steppe and desert fringes has been a major theme in explaining long-term trends in Chinese, Eurasian and Middle Eastern civilizations (Di Cosmo 2009; Ward-Perkins 2005; Barfield 1989; Grousset 2010; Lattimore 1940). Though these early accounts have since been criticized and updated, the fundamental interaction of changing environmental and societal conditions has been reinforced, showing direct

and powerful influences from climate change, resource scarcity and disease vectors on the evolution of specific human societies (Squatriti 2010).

The implicit presumption of some early accounts has been that long-living historical societies somehow functioned in harmony with their environment to manage their resources effectively. Unfortunately, this assumption tends to conceal several dangerous trends within such civilizational complexes. These include rapid growth in population and resource exploitation during good years until unsustainable maxima are achieved, leading to follow-on crises in societal well-being impacted by environmental triggers and related economic and political stresses (possible factors in the so-called Intermediate Periods of Egypt); high levels of population living in sustainable poverty ("hungry homeostasis") while soil and ecological resources are gradually eroded; and ongoing pressure on viable river systems, as has occurred for the Indus, Brahmaputra, Nile, Jordan, and Yellow rivers, as well as for the Aral Sea basin (Bevan et al. 2017; Lee and Zhang 2013; Brewer 2012, 124-142; Butz 2012; ICA 2012; Fu et al. 2006).

Likewise, the assumption of natural stability and unchanging harmony in traditional human ecosystems is not supported by the growing understanding of the dynamic nature of earth-processes: extreme weather fluctuations (e.g., the El Niño and La Niña cycles across the Pacific Ocean), the possible impact of major volcanic events in shaping early human societies, the role of global warming periods in radically changing environmental conditions, and an ongoing sixth mass extinction with serious implications for human civilization (Ceballos et al. 2017; Delanty and Mota 2017; Doocy et al. 2013; Williams 2012; for limitations to some of these theories, see Yost et al. 2018). The problem is not of being an eco-civilization, but of becoming a sustainable Ecological Civilization with high levels of environmental protection, human development, adaptive resilience and positive societal evolution. This is not a simple issue of being in harmony with nature nor of managing environmental carrying power in the face of rising human expectations.

Although efforts have been made to link current ecological needs with traditional notions of harmony between humans and nature, as found in

Confucianism and Taoism, this link is somewhat indirect. The logic of Confucianism argues that humans were enmeshed within a Heaven-Human-Earth triad and that the creative collaboration of these three forces indicated the conditions of good governance (Ferguson amd Dellios 2017a). This suggests that governance had to concern itself with cosmological factors that shaped the wider human environment, while for neo-Confucian thinkers such as Zhang Zai (1020-1077), the Earth was seen as the "mother," and humans should have a concern for all creatures and things as companions (Li 2003). These connections have since been revived by thinkers such as Tu Weiming, seeking to build bridges between contemporary Confucian ethics and new models of human development (Tu 2004; Dellios 2018). However, the Heaven-Human-Earth triad is more a cosmological conception than an ecological one, with limited understanding of underlying biological processes. Likewise, government promotion of a Beautiful China (UNEP 2016) is as much based on aesthetic and marketing grounds as on environmental ones (Yao 2014). Building a positive eco-civilization needs to go beyond these general orientations. It requires a complex understanding of dynamic interactions amid changing ecological conditions, evolving human developmental needs, and the complex web of political interactions that constitute national resilience and global governance.

CHINA'S ECOLOGICAL CIVILIZATION CONSTRUCTION

Over the last decade the Chinese government has come to recognize the serious costs of environmental degradation accelerated by industrialization, rising national needs and the societal expectations unleased through modernization and the 'China Dream' agenda operating since 2013. The linking of economic, energy, development, social and foreign-relations policy under an integrated rubric has in part been managed through the concept of China as an evolving eco-civilization. The core aim can be summarized as "to balance the relationship between humanity and nature, which includes economic development, population, resources and the environment" (Climate Group 2014). It was seen as one of the necessary

pillars of development, which should be "innovative, coordinated, green, open and shared" (UNEP 2016, 3). This approach gained intellectual traction through the 1980s and 1990s, was initiated at the policy level as early as October 2007 at the 17th Congress of the CPC, was further articulated in the Central Committee of the CPC's working report of 2012, and gained extended government endorsement under the leadership of Xi Jinping (Huan 2016). The construction of an Ecological Civilization has been given the status of a National Development Strategy, is embedded in the 13th Five-Year Plan (for 2016-2020), and gained further endorsement in major meetings of the CPC and the National People's Congress through 2017-2018 (*Xinhuanet* 2015).

China has grappled with the balance between human needs and environmental management for millennia. Renowned as pioneers in irrigation and agricultural expansion, early Chinese states developed philosophies and policies directly supportive of agriculture as the root on which the other branches of the society and state were established. The difficulty of maintaining a growing population on the land without excessive human and environmental exploitation, however, became a major challenge for all imperial dynasties. Today, this has transformed into the contemporary challenge of boosting national wealth, increasing GDP per capita, providing energy and food security, ensuring rural livelihoods and avoiding massive pollution and related health costs during periods of intensified industrialization and urbanization (Tracy et al. 2017). These factors have turned China's quest for a truly Ecological Civilization in the 21st century into a national necessity rather than an optional aspiration. Since China remains the world's largest greenhouse gas emitter and the most populous state, it generates crucial implications for global environmental sustainability, climate change policy and the UN's Sustainable Development Goals.

China's viewpoint was not just focused on the end product of a sustainable eco-civilization but the process of eco-civilization construction (*shengtaiwenming jianshe*) that included the transformation toward a "socialist eco-civilization" in which social justice and ecological sustainability are combined (Huan 2016, 51, 60). Eco-civilization

construction thus became a central goal "alongside economic growth, political modernisation, social development and social construction" (Huan 2016, 54). Major documents that elucidated these policies included the *Decision to Comprehensively Deepen the Reform of Several Major Issues* of 2013 and the *Integrated Reform Plan for Promoting Ecological Progress* of 2015 (PRC 2015; Huan 2016). However, rather than rigid definitions or set of benchmarks, eco-civilization remains a conceptual and political approach to a range of developmental and environmental issues:

> At the level of philosophy and ethics, eco-civilization is a weak eco-centrist (environmentally friendly) natural or ecological relation value and morality; at the level of political ideology, eco-civilization is an alternative economic and social formula differing from the dominating capitalist one; at the practical level, eco-civilization construction refers to the part of appropriate relations between humans and nature throughout the process of creating a socialist civilization, or the governments' daily-work of ecological and environmental protection; in the specific context of modernization and development, eco-civilization construction refers to the green dimension of socialist modernization and economic and social development. What I want to emphasize is that, while talking about eco-civilization, we should notice both the double dimensions of theory and practice and the double dimensions of "deep-green" and "red–green" perspectives (Huan 2016, 56).

At present, China's Eco-Civilization represents a mix of aspiration, policy formation, and limited implementation. It has begun to be integrated into the environmental planning in each five-year plan and other key policy documents, leading to a mainstreaming of environmental issues in government and public awareness. Since 2007, approximately 4000 articles and books and over 170,000 media articles have been published on the concept, and China has 6,000 organizations related to environmental issues, with 700 being registered NGOs, though overseas funding of such groups is now tightly regulated, and many might be viewed more as GONGOs (government-oriented NGOs) rather than independent civil society organisations (Heurtebise 2017; UNEP 2016; Economy 2018).

From 2013, China began considering the boundaries for environmental sustainability and is developing a system of Ecological Protection Red Lines

(EPRLs), based on crucial protecting ecological functions and sensitive areas, with thresholds established for different areas and land-usage patterns (Economy 2018; Huan 2016; Tracy et al. 2017; UNEP 2016). Systems of eco-compensation, along with green credit and emission trading schemes are being gradually implemented after pilot projects run from 2013 (PRC 2015 Sections 42-43; Qi and Chang 2018; Haun 2016; Tracy et al. 2017; UNEP 2016). Enforcement of environmental protection laws have increased, both in terms of fines and criminal prosecutions, since 2014, while there has been the progressive empowerment of the PRC's State Forestry Administration from 2003 and enlargement of the Ministry of Environmental Protection (first elevated in 2008 into a cabinet ministry) as the Ministry of Ecology and the Environment as of 2018 (Huan 2016; Tracy et al. 2017; UNEP 2016; Zhang et al. 2017; EU – China Environmental Governance Programme 2014; Economy 2018). There has been a more extensive use of EIAs (Environmental Impact Studies), especially across key development zones in coastal areas, with national level projects involving more than $117.4 billion across project sectors such as "transport, electric power, steel and nonferrous metal, coal and chemical engineering, and petrochemical industries" (UNEP 2016, 19). There have also been recommendations made to expand the use of EIAs in China's *Going Global* agenda, its South-South Cooperation strategies and along the Belt and Road Initiative (BRI), though this is still an area that needs tighter governance (Tracy et al. 2017; Ferguson 2018; UNEP 2016).

In 2015, the PRC committed itself to achieve a peak of carbon dioxide emissions by 2030 (if not earlier) to lower carbon dioxide emissions per unit of GDP (carbon intensity) by 60% to 65% from the 2005 level and to increase the share of non-fossil fuels in primary energy consumption to circa 20%, targeting an interim rise to 15% by 2020 (Department of Climate Change 2015; Tracy et al. 2017; Huan 2016; UNEP 2016). China has made large investments in renewable energy sources (from 2016 these were larger than the EU or US), especially in solar and wind power, including investment in hydro-resources, although electricity production still remains heavily reliant on coal power plants and to some degree nuclear power stations (Economy 2018). This will be supplemented by an emerging system

of "green finance," with China accounting for 40% of global renewable capacity through 2017, and China's National Energy Administration planning to spend $360 billion on renewable power by 2020 (Turner 2018; IEA 2017; PRC 2015, Sections 45-46; Hood 2017). China also plans the ongoing construction of some 230 eco-cities within the country, improving shortcomings to transform China's urban environments and reduce their carbon and energy footprints, although concerns have been expressed with regard to the reality of environmental gains made in some earlier projects (e.g., failing eco-cities such as Dongtan and Nahui, Li and Yang 2015; Tracy et al. 2017; Pow 2017; Chang 1987). More comprehensive approaches are also being developed for city spatial management, land-use and environmental protection, with Xiamen (Fujian province) as one early testing point among 28 cities and counties (UNEP 2016). Alongside this, China has begun an enhanced plan for protected environmental areas (covering 1.7 million square kms with 1.47 million square kms of nature reserves), plus large scale reforestation programs, such as in Xinjiang, along the fringes of the Gobi (the 'Green Great Wall' program), and parts of the northwest, as well as logging bans in northeast provinces (Huan 2016; Tracy et al. 2017).

The PRC's Eco-Civilization is not a narrow national agenda, since China is now deeply engaged in the capitalist global economy, with exports and two-way flows of investment important aspects of sustained economic growth (in 2006, the share of exports in China's GDP was 18.61% (*Statistica* 2018a). The green-left and ecological Marxist positions argue that the capitalist system, with its emphasis on economic growth, means that China needs to work towards an alternative path of modernization that will influence global trends of production and living (Huan 2016, 62; Wang 2006; Gare, 2008, 2012). One path for reform was seen as the linking of state power and popular participation on environmental issues, drawing in both traditional culture and socialist values (Yu in Gare 2012). Likewise, from implementation at the national level, it will be crucial to see whether China will actively support the greening of the economic corridors in its international investment and trade. This is especially important for the evolution of the BRI, with concerns that PRC's economic reform will push

polluting industries and production into poor partner countries (Tracy et al. 2017; Economy 2018; Ferguson 2018).

The scale of the challenges facing China and its partners in establishing an Eco-Civilization can be seen in just one aspect of this problem: creating a sustainable agricultural system and secure food supply. Historically, the Chinese polity, as a set of institutions and social technologies, became a master at expanding its resource base, but only at massive human and environmental costs. Likewise, today, the twin impacts of increasing urbanisation and ecological damage have made food and environmental security major concerns even for a relatively affluent PRC.

CHINA'S PROBLEMATIC MASTERY OF AGRICULTURAL RESOURCES

China emerged as a major *agricultural civilization* able to master hydraulic techniques and use diverse food sources, including the expansion of different types of grain production. The traditional five grains were rapidly expanded into a wider range of varieties and staples (Wang 2006), allowing for intensified production of crops in both northern and southern China. In early China, intensive agriculture and irrigation were key skills traditionally viewed as laid down by the mythical founder, the Yellow Emperor' (*Huangdi*), and other cultural heroes. Early traditions included notions of the proper use of resources within seasonal cycles, thereby avoiding overexploitation of fisheries and forests (Li 2003). In parallel, from the third millennium BCE a growing core of Chinese culture began to shape a shared cultural system, expanding out from the core areas near the Yellow and Wei Rivers, with early interactions along the Yangtze River basin and into Sichuan (Yan et al. 2012; Ferguson and Dellios 2017a). On this basis, the rapid expansion of China's early population was due in part to the construction of enduring political systems that could utilize expanded agricultural resources and to the replication of the social knowledge needed to utilise that environment (Ferguson 2004).

Though many classic Chinese institutions had been developed in the first millennium BCE and were entrenched by the time of the Han Dynasty (206 BCE – 220 CE), it was only thereafter that extended territories could be opened up to the west and south through intensified agricultural exploitation. From the Sui and Tang dynasties this included increasingly higher population and rice production levels in Southern China (Wang 2006). During periods of stability, household numbers could grow considerably. For example, in one estimate, the number of households in 629 CE was over 3.1 million with a likely population of 13.2 million, and by 755 it had grown to 8.9 million households with a population of around 52.9 million (Wang 2006, 144-145). Such growth in population, extended in the Song dynasty, was aided by a number of factors beyond simple birth/death rates, including immigration from the north, incentives to clear and register waste land, careful financing, management of labour and tenants, and improved agricultural practices, including better fertilizers, irrigation to reduce salt and alkaline content, multi-cropping and comprehensive land use, issues already dealt with in texts such as Cheng Pu's *On Farming*, written circa 1149 (Wang 2006).

During the Tang period, laws were passed to encourage self-employed farmers to open up land and to legalize its ownership or use, though this trend was disturbed by the An-Shi (An Lushan) rebellion of the mid-eighth century. Moreover, land reclamation in the Song period of farmland peaked at 100.8 million acres, indicating a serious expansion of agricultural resources (Wang 2006, 149-160). Along with more open, integrated and commercially active cities, this laid the basis in gradually increasing maximum populations for the following unified dynasties. During the High Qing period population levels rose rapidly, from a low of 88.5 million in 1646 (after the collapse of the Ming dynasty), aided by a warm temperature phase, expansion and resumption of farmlands, and increased agricultural yields down towards the end of the 18th century (Lee and Zhang 2013). By 1850-1851, the population had already reached circa 410-440 million, based on adjusted census figures (for problems in making exact estimates, see Lee and Zhang 2013). Recorded population collapses would occur during periods of intense political chaos, such as at the fall of the Ming Dynasty

(early 17th century) and in the later Taiping Rebellion (1851-1864), with cycles of climate change and temperature factors affecting periods of agricultural expansion and population recovery (Lee and Zhang 2013). This 19th century population still relied on successful and stable agricultural production, augmented by emerging industries (including textiles and mining), enhanced transport links, and the development of commerce and banks (Fenby 2008; Ferguson and Dellios 2017a; Ji 2003)

For traditional Chinese political thought agriculture rather than industry or trade always remained the first branch or root of the wealth of a kingdom, views put forward by Confucius and thinkers such as Jia Yi of the second century BCE. This would influence Han and later imperial institutions, with agronomy the foundation (*ben*) as a science of state and the basis of legitimate rule (Bray 2008; Shouyi 1982). Likewise, various strands of Taoist thought saw in the small village the prototype of the largest natural human community, and thinkers such as Xu Xing (Hsü Hsing), a contemporary of Mencius, promoted the idea of communism and agricultural socialism (Mei 1934). The Mohists, too, argued for agriculture as the basis of society and for frugal, utilitarian government that would not waste human lives or effort (Watson 1958). A direct recognition of the fundamental role of agriculture and need to maintain a stable government and farming population is found in the *Analects* of Confucius (12.11) where Duke Jing of Qi asks about proper government. Confucius replies: "Let the ruler be a ruler, the subject a subject, the father a father, the son a son." In other words, the ruler and ruled should take on the necessary roles and responsibilities for a functioning society. The questioner, the Duke of Jing, then replies to Confucius: "Splendid! Truly, if the ruler be not a ruler, the subject not a subject, the father not a father, the son not a son, then even if there be grain, would I get to eat it?" (Confucius 2012). This principle, known as the "rectification of names," implies that a failure to live up to social roles would result in political and economic chaos. Failures in planting, harvesting and distribution of staples for any reason, including droughts, floods and wars, were a disaster for any dynasty (Dellios and Ferguson 2013).

Concern for the survival and basic welfare of the people had already become a commonplace feature in the thought of Confucius, Mencius, Xunzi (Hsün Tzu) Mozi (Mo Tzu) and Lao Tzu, and became one of the criteria for judging the morality of a government and its long-term stability (Dellios and Ferguson 2013; Chang 1987). However, in reality, maintaining a satisfied tier of agriculturalists was always problematic for the Chinese empire. Imperial administrations were aware that times of famine and drought were also the times when rebellion and revolution prospered. Rural rebellions with a peasant component were recorded as early as the revolt of 209 BCE, inspired by Ch'en She (a hired field worker) who rounded up border guards and people of "the most humble origin" against the Qin (Watson 1958; for limitations of the term peasant to Chinese conditions, largely based on free small farmers, see Mote 1999, 365). Imperial China thereafter had to contend with recurring rural revolts, the most determined of which was that of the Yellow Turbans, from 184 CE onwards, in which major armies, numbering in the hundreds of thousands, managed to destabilise imperial rule in large areas of China for decades (Shouyi 1982; Fitzgerald 1965). These rural revolts were the bane of dynasties which attempted to extract high levels of taxation and labour without adequate attention to the agricultural and human resources of the country. They emerged as a major problem under the Eastern Han dynasty (25-220 CE) and recurred in later periods, such as major revolts in the 860s and 870s, while in 880 rebel forces even managed to capture Chang'an, the capital of the Tang dynasty (Shouyi 1982). Major revolts also occurred in 920, 993-995, and 1120-1127 CE, while from 1130 the Red Jackets promoted ideas of "equality between the high and the low" and equal distribution of wealth between the rich and the poor. From 1343 to 1362, the army of the Red Scarves (or Red Turbans) managed to mobilise over a hundred thousand disgruntled farmers and labourers, but were crushed largely due to their internal divisions during a period of contending warlords (Mote 1999, 529-533; Shouyi 1982, 258-304).

Rural revolts were also one of the main factors in the decline of the Ming dynasty. The interesting use of the title King of the Levellers used by one of their leaders, Deng Maoqi (1448-9 CE) indicates that some of these revolts

were based on consciousness of the exploitation and inequality forced on sectors of the Chinese population (Shouyi 1982, 258-368). Secret societies such as the White Lotus Society, the Heaven and Earth Society (also known as the Triad Society) and First Heaven remained active from the 17th century through to the early 19th centuries, and were associated with resistance to exploitation by landlords and corrupt government officials (Mote 1999; Shouyi 1982). Although the long term effect of these revolts was limited, they helped undermine the pattern of serfdom, presaging more radical transformations of social relations in the 19-20th centuries (Elvin 1973). Both the Taiping revolutionary forces and the later *Yi He Tuan* (Militia United in Righteousness) movement (more commonly known as the Boxers) were largely based on rural forces, even if triggered by factors ranging from drought to resentment at foreign influence (Xiang 2003; Haw 1990; Shouyi 1982). The theme of peasant rebellions would became a major one in Chinese Communist historiography and was often interpreted within the doctrines of class war and mass action (Unger 1993; Wright 1953).

It is not surprising that the Communist leadership under Mao based their revolution largely on peasant support (rather than the urban proletariat) and that when the time came for capitalist reform, Deng Xiaoping tried to ensure that the welfare of China's small farmers was well-buffered against inflation and displacement. Modernisation in the areas of agriculture was one of the first areas of reform in the 1980s (alongside industry, science and technology, and defence), with rural reform thereafter aimed at ensuring a prosperous class of farmers that would help buffer social stability even as society shifted towards "capitalism with Chinese characteristics." Indeed, leaders down to Xi Jinping have sought to maintain a prosperous community of small farmers, in many cases interconnected into local labour flows and small-and-medium sized businesses operating around city fringes. This has been successful in some prosperous coastal regions, especially in more southern areas under intensive cultivation in wealthy provinces. However, elsewhere rural protests have intensified due to factors ranging across uncontrolled pollution, illegal land seizures and official corruption (Economy 2018; Li 2016). The PRC government has responded in part by

mainstreaming socialist and environmental policies since 2015 that seek a new comprehensive revision and assessment of land use:

> Across its entire 9,600,000 km^2 of land area, China will establish four development categories - optimal development, targeted development, restricted development, and no development – overlaid with three principle functions: economic development in urbanized areas, agriculture in major farming areas, and ecological service in key areas of ecological functions (UNEP 2016, 6).

Combined with intensified urbanisation trends (56 - 57% of the population living in cities in 2016, up from 44.3% in 2006), stricter environmental laws, and some buy back of land for re-forestation (Green-for-Grain, centrally funded by $66.6 billion in the first round), this is changing the dynamics of food production in modern PRC (*Statistica* 2018b; UNEP 2016).

Alongside these social tensions, the long-term impact on water, soil and biodiversity brought China to an emerging environmental crisis that was recognized from the late 1970s, but has only recently been integrated into national planning. The build-up of environmental pressures can be seen in the fate of the Yellow River, which until major revival schemes (run by the Yellow River Conservancy Commission) often did not reach the sea. In addition, pollution in the Yangtze and Pearl Rivers, desertification and soil erosion across north-west China, and massive air pollution in major cities in the north were also major problems (Lu et al. 2016; Watts 2011; Fu 2006). The modern expansion of agricultural production has also come at a high environmental cost, especially with excessive use of synthetic and natural fertilizers, plus heavy-metal contamination of farmland near cities and industrial areas, leading to a range of soil, water and health problems (Norse and Ju 2015). These factors resulted in a large-scale reassessment of the balance between environmental and agricultural policies (2007-2015), leading to the implementation of ambitious Eco-Civilization Targets for 2020, comprehensive assessment of land use and upgrading of forest coverage to 23% (currently circa 21.66%), improving prairie vegetation

coverage of 56%, and 35% of natural shore-lines to be preserved, along with improved pollution and emissions legislation (UNEP 2016, 6, 38).

Whether the ecological outcomes of these policies can be brought to fruition remains to be seen. Comparisons can be made of China to a large ship that is slow to turn, even with a decisive captain at the helm. However, in terms of follow-on environmental outcomes it may be wiser to think of these initiatives as a tug pulling a series of heavy barges on a long cable. A turn by the tug is transmitted by a series of intervening vectors and tensions, with delays in follow-through from government decision-making into economic and natural cycles. Environmental remediation, in particular, may not be easily achieved in the early 2020 or 2030 national targets, although the government is now instituting ecological compensation schemes designed to channel spending into an environmental clean-up. This is largely based on funding from ministries and provincial governments, though liability insurance schemes for environmental pollution have been an increasing trend since 2007 and may become mandatory across some polluting industries, with 45,000 companies insured and $15.45 billion already set aside to such risks (UNEP 2016).

FOOD SECURITY IN THE 21ST CENTURY CONTEXT

One of modern China's great achievements has been the massive reduction of food scarcity, elimination of famine, and an overall reduction of national poverty levels; circa 700 million were lifted out of poverty through 1980-2011, thanks in part to targeted alleviation programs, land policy innovations and relocation schemes (Zhou et al. 2018). From the 1960s there has been an expansion and intensification of grain, vegetable and fruit production, thereafter boosted by reforms following de-collectivization and private use (but not ownership) of farmland. However, there has been an ecological cost associated with past patterns of improved food security:

> China's successful achievement of food security in recent decades has resulted in serious damage to the environment upstream of the agricultural sector, on farm and downstream. The environmental damage is biological, physical and chemical, particularly in terms of changes in soil processes and ecosystem function, with impacts at all levels from the local to the global. It has serious negative impacts on current and the long-term food security, and on the economy with estimated losses of up to 7% . . . of China's agricultural GDP and 2% of gross national income (Norse and Ju 2015, 5; for higher total costs including water and air pollution of up to 4 - 9%, see Norse and Ju 2015, 6, 11).

World Bank estimates suggest that up to 19.4% of PRC's arable land is contaminated and that the arable land per capita has declined from 0.16 to 0.09 hectares from 1961 to 2015 (World Bank 2018a). Furthermore, pockets of rural poverty remain a major concern for the CPC, along with serious gaps between rich and poor. President Xi Jinping's New Year address at the end of 2015 still spoke of the domestic need for "green development that is also open and shared by all" and of the importance of getting "the tens of millions of rural population out of poverty" (Xi 2015). The government claimed to have lifted 66.63 million out of rural poverty through 2012-2015, but noted that 50 million in total were still below national poverty lines in 2016, with the 2016-2020 Five-Year Plan seeking to eliminate poverty by 2020 (*Xinhuanet* 2015). Upgraded local infrastructure (especially road, water, and power links), better public services, improved land-use regulations and local resource benefit-sharing were outlined in the 13th Five-Year Plan, along with subsidies for ecological conservation (PRC 2016, Chapters 56-58). The government is now seeking more carefully to enforce and manage land use, as outlined in farmland protection regulations designed to ensure: "1) strict control over the conversion of cultivated land into non-cultivated land; 2) implementation of a system that charges for occupying farmland for non-farming purposes; 3) strict protection of essential farmland; and 4) promotion of land development, reclamation, and consolidation" (UNEP 2016, 13).

An evolving area of concern has been China's balanced management of its food security and environmental resources, based on better use of domestic farmland, limited food imports, plus some acquisition of farms and

food-processing facilities overseas. Food security has numerous definitions but at the basic level can be broadly defined as "when all people at all times have physical, social and economic access to food, which is safe and consumed in sufficient quantity and quality to meet their dietary needs and food preferences, and is supported by an environment of adequate sanitation, health services and care, allowing for a healthy and active life" (Committee on World Food Security, in Gibson 2012). Food security has to factor in major issues such as accessibility, availability, proper biological utilization and preparation, plus stability of prices and production (Gibson 2012). Modern China has greatly reduced nutrition problems since the early 1990s, with undernourishment falling from 24.5% in 1992 to 9.3 - 9.6% through 2014-2015, with public concerns more focused on quality and safety of food, plus the ability to meet increased consumption of meat, fish and proteins (CSIS 2017; World Bank 2018b).

Although domestic food production has generally increased since 1965 (cereal production has increased from 173 million tons to over 580 million tons in 2016), the PRC is now a net food importer, with food imports slowly rising from 2008 to comprise circa 7% of total imports in 2015, with a slight drop to 6.53% in 2016 (World Bank 2018a; World Bank 2018c). China would prefer to be self-sufficient in staple grains (originally targeted at 90 - 95%) but knows food imports could become critical in a world seeking to feed growing populations in Asia, Africa and South America (Niu et al. 2017; Zhang 2016; Norse and Ju 2015; NTS 2010). Aligning these policies with the UN's SDGs, China has sought to end hunger, achieve food security, and promote sustainable agriculture with the following targets:

> By 2020, maintain national grain production at above 600 billion kilograms, ensure ample supplies of wheat, grain, edible oil, meat, egg, milk, fruit, vegetable and tea, and ensure at least 97 percent of qualification rate in safety of major agricultural products. Strengthen the food security mechanism for needy groups, ensuring year-round safe, nutritious and ample food supply for all . . . .
>
> Implement the National Plan for Sustainable Agricultural Development (2015-2030). By 2020, ensure early positive results in sustainable agricultural development. By 2030, achieve notable progress in sustainable agricultural development and establish a new model of sustainable agricultural development featuring adequate supplies, high

> resource efficiency, fertile farmlands, stable ecosystem, prosperous rural households, and pastoral beauty. Vigorously promote eco-friendly agriculture by promoting zero growth in fertilizers and pesticides. Launch circular agriculture demonstration projects and set up pilot zones of sustainable agricultural development (FMPRC 2016, 19; for circular agricultural systems with lower production and environmental costs, see Esposito et al. 2016; Troop et al. 2017).

In the 2016-2020 Five-Year Plan the emphasis was on developing high quality farmland (development of 53 million hectares initially and eventually 67 million hectares), ensuring basic self-sufficiency in cereal grains, along with improved quality and safety of food products (PRC 2016). This includes better water conservancy, restoration of rural farmland, and strict control over the way agricultural land is used or converted for other purposes. The overall aim of current planning is to improve the quality of agriculture and to increase environmental protection by setting clear guidelines for land use and boundaries to protect intact ecological systems (UNEP 2016).

However, the last Five-Year Plan also makes it clear that food security is based not just on domestic production, but requires international cooperation:

> We will improve mechanisms for regulating trade in agricultural products, optimize the mix of sources of imports, expand exports of competitive agricultural products while ensuring domestic supply, and appropriately increase imports of agricultural products that are in short supply at home. We will actively pursue agricultural cooperation and development overseas, establish large-scale offshore centers for farm product production, processing, storage, and transportation, and cultivate internationally competitive multinational agricultural companies. We will broaden the areas of international agricultural cooperation and support bilateral and multilateral cooperation in agricultural technology (PRC 2016).

Food investments and land acquisitions (on a limited but rising scale) by China have occurred in 33 countries, including Russia, Thailand, Indonesia, Cambodia, Indonesia, the Philippines, Australia, New Zealand, sub-Saharan Africa, the US and Canada (Niu et al. 2017; CSIS 2017). Such purchases

can lead to tensions in bilateral relations: in Tajikistan some 1,500 Chinese farmers were brought in to grow rice in Khatlon province on 2000 hectares, as part of PRC's food security agenda, leading to some local resentment, while there has been strong public criticism of farm acquisitions in countries as diverse Australia and Iceland (*Eurasianet* 2011). In Australia, China is the largest source of agribusiness investment, with over $2.5 billion spent on farms and related facilities, leading to treasury blockage of some purchases, such as of large cattle ranches comprising 2.5% of Australia's total land area and of the major grain and oilseed producer GrainCorp (CSIS 2017; Smith 2015).

Increasing costs of staple foods and grains may continue due to the shifting impact of climate change and desertification. For example, it has been suggested that across wider Central Asia and parts of Africa: "in the next 25 years soil degradation could cause a 12% drop in global grain harvests, and a 30% rise in grain prices. Without a long-term strategy to resolve the problem, desertification will affect food supplies, cause migration and threaten the stability of many countries and regions" (Liu 2016). In the long run, China may have to "maintain sufficient strategic food reserve which can meet the country's food needs based on subsistence consumption level" during emergencies, but also improve its international food policies:

> To mitigate these risks, a global agricultural policy should be adopted, and this global agricultural policy should include the following five major components: agricultural import diversification, overseas agricultural investment, global agricultural cooperation, forming strategic trading partners and building global agricultural commodity exchange centers (Zhang 2016).

However, these threat perceptions, triggered in part by the major global food supply crisis of 2008-2009, prices rises through 2010-2012, and continued pressure on domestic food prices in many developing countries through 2009-2017 (UN 2017a, 2017b; FAO 2018), should not be exaggerated. The PRC's net need to import food, including a rise in protein and highly processed foods, has been beneficial to producers from the US,

France, the Netherlands, Australia, Brazil and many other countries and has even been a bargaining chip in recent US-China trade talks (Ng 2018). Although land grab scenarios have been exaggerated (Brautigam 2015), the PRC will still have to carefully calibrate the gains for its own food security programs in relation to the perceptions of partner states, especially along the BRI corridors (Ferguson 2018).

CHALLENGING BUT NOT BEYOND REACH: ECO-CIVILIZATION AS SOCIETAL SECURITY

These trends show that China's food security is now being calibrated within the notion of an Eco-Civilizational transition, including increased care for ecological services and environmental costs. Nonetheless, patterns of industrial pollution, overuse of fertilizers (both synthetic and natural), continued use of coal power and increased consumer demands have made this an enormous challenge for the Chinese government (Norse and Ju 2015). The PRC leadership is now being tested by the need to balance a range of human societal needs, including economic, environmental, food, and health security. Put another way, a balanced Eco-Civilization approach would go a long way to enhancing personal and community needs, such as creating a subset of human security needs as identified by the UNDP from 1994 onwards and now embedded in the UN SDGs. (FMPRC 2016; Dellios and Ferguson 2017; FAO 2016; Gomez and Gasper 2013; Albon 2009). The PRC pursues this in the context of a revised path towards "green socialism with Chinese characteristics." Though the PRC has consciously linked its national planning with Climate Change and SDG agendas, there are limits to how far it can move in this direction. The Eco-Civilizational approach, insofar as it would entrench CPC's leadership role rather than widen political liberties, would not meet the requirements for political security, human rights and the generalized freedom from fear outlined in UN frameworks (FAO 2016). However, its recognition of the need for interlinked economic, developmental and environmental governance at the national and global levels is the beginning of an informed globalism that might well evolve into

a truly planetary outlook, essential in a world increasingly impacted by human action.

REFERENCES

Albon, Christopher R. (2009). "Human Security's Many Definitions," *Conflict Health*, http://conflicthealth.com/human-securitys-many-definitions.

Barfield, Thomas J. (1989). *The Perilous Frontier: Nomadic Empires and China*, *221 B.C. to A.D. 1757*. Cambridge: Blackwell Publishers, 1989.

Bevan, Andrew., et al. (2017) "Holocene Fluctuations in Human Population Demonstrate Repeated Links to Food Production and Climate." *Proceedings of the National Academy of Science of the United States of America*, http://www.pnas.org/content/pnas/114/49/ E10524.full.pdf.

Brautigam, Deborah. (2015). *Will Africa Feed China?* Oxford: Oxford University Press.

Bray, Francesco. (2008). "Science, Technique, Technology: Passages between Matter and Knowledge in Imperial Chinese Agriculture." *The British Journal for the History of Science*, *41*(3), 319- 344.

Brewer, Douglas J. (2012). *The Archaeology of Ancient Egypt: Beyond Pharaohs*. Cambridge: Cambridge University Press.

Butz, Karl W. (2012). "Collapse, Environment, and Society." *Proceedings of the National Academy of Science of the United States of America*, *109*, 3632-3639.

CAAC. (2014). *Performance Assessment Measures for Air Pollution Prevention and Control Action Plan (For Trail Implementation)*, English Translation. Beijing: China Clean Air Updates, Clean Air Alliance of China.

Ceballos, Gerardo. et al. (2017). "Biological Annihilation via the Sixth Mass Extinction Signaled by Vertebrate Population Losses and Declines." *Proceedings of the National Academy of Science of the United States of America*, http://library.fes.de/pdf-files/wiso/12622. pdf.

Chang, James L. Y. (1987). "History of Chinese Economic Thought: Overview of Recent Works." *History of Political Economy*., *19*, 481-502.

Climate Group. (2014). "Eco-Civilization: China's Blueprint for A New Era." *Insight Briefing*, http://www.theclimategroup.org/ _assets/files/ China-Ecocivilisation.pdf.

Confucius. (2012). *The Analects*, Translated by R. Dawson. Oxford: Oxford University Press.

Crutzen, Paul J. "Geology of Mankind," *Nature*, *415*, 23.

Crutzen, Paul J. & Christian, Schwagerl. (2011). "Living in the Anthropocene: Towards a New Global Ethos." *Environment*, *360*, http://e360.yale.edu/feature/living_in_the_anthropocene_toward_a_new_global_ethos/2363/.

Crutzen, Paul J. & Eugene, F. Stoermer. (2000). "The Anthropocene." *IGBP Global Change Newsletter*, *41*, 17–18.

CSIS. (2017). "How is China Feeding its Population of 1.4 Billion?" *China Power*, https://chinapower.csis.org/china-food-security/.

Delanty, Gerard. & Aurea, Mota. (2017). "Governing the Anthropocene." *European Journal of Social Theory*, *20*, 9-38

Dellios, Rosita. (2018). "A Confucian Lesson in Development." Paper presented at the First International Seminar on Development in Action, the International Institute for Development Studies (IIDS), Kolkata.

Dellios, Rosita. & James Ferguson, R. (2013). *China's Quest for Global Order: From Peaceful Rise to Harmonious World*. Lanham MD: Lexington Books.

Dellios, Rosita. & James Ferguson, R. (2017). "The Human Security Dimension of China's Belt and Road Initiative." *Journal of Management and Sustainability*, *7*(3), 48-62.

Department of Climate Change. (2015). *Enhanced Actions on Climate Change*. National Development and Reform Commission, PRC, http:// www4.unfccc.int/ndcregistry/PublishedDocuments/China%20First/China%27s%20First%20NDC%20Submission.pdf.

Di Cosmo, Nicola. (2009) "Han Frontiers: Toward an Integrated View." *Journal of the American Oriental Society, 129*, 199-214.

Doocy, Shannon., et al. (2013). "The Human Impact of Volcanoes: A Historical Review of Events 1900-2009 and Systematic Literature Review." *PLoS Currents*, doi: 10.1371/currents.dis.841859091a706 efebf8a30f4ed7a1901.

Economy, Elizabeth. (2018). *The Third Revolution: Xi Jinping and the New Chinese State*. Oxford: Oxford University Press.

Elvin, Mark. (1973). *The Pattern of the Chinese Past*. Stanford: Stanford University Press.

Esposito, Mark., et al. (2016). "The Development of Circular Economies in China." *European Business Review*, *19*, http://www.european businessreview.com/the-development-of-circular-economies-in-china/.

EU – China Environmental Governance Programme. (2014). *Environmental Protection Law of the People's Republic of China*. https://www.chinadialogue.net/Environmental-Protection-Law-2014-e 24 April 2014 version.pdf.

Eurasianet. (2011). "Tajikistan: China's Advance Causing Increasing Unease Among Tajiks." Eurasianet.org, http://www.eurasianet.org/ node/62894.

Fenby, Jonathan. (2008). *Modern China: The Fall and Rise of a Great Power*, *1850 to the Present*, NY: Harper Collins, 2008.

FAO. (2016). *Human Security and Food Security*. Rome: Food and Agricultural Organization of the United Nations. 2016.

FAO. (2018). *World Food Situation*. Rome: Food and Agricultural Organization of the United Nations.

Ferguson, R. James. (2004). "Environmental Sustainability in India and China: Prospects and Risks." In *Twentieth Century Development: Some Relevant Issues*, Edited by K.C. Roy and R.N. Gosh, 275-302. New York: Nova Science.

Ferguson, R. James. (2018). *China's Eurasian Dilemmas: Roads and Risks for a Sustainable Global Power*. Cheltenham, UK: Edward Elgar Publishing.

Ferguson, R. James. & Rosita, Dellios. (2017). *The Politics and Philosophy of Chinese Power: The Timeless and the Timely*. Lanham, MD: Lexington Books.

Fitzgerald, C. P. (1965). *China: A Short Cultural History*. London: Cresset Press.

FMPRC. (2016). *China's National Plan on Implementation of the 2030 Agenda for Sustainable Development*. Beijing: Foreign Ministry of the People's Republic of China.

Fu, Guobin., et al. (2006). "Water Crisis in the Huang Ho (Yellow) River: Facts, Reasons, Impacts, and Countermeasures." *River Symposium*, http://archive.riversymposium.com/2006/index.php?element=Fu+Guobin.

Gare, Arran. (2008). "Marxism and the Problem of Creating an Environmentally Sustainable Civilization in China." *Capitalism Nature Socialism*, *19*, 5–26.

Gare, Arran. (2012). "China and the Struggle for Ecological Civilization." *Capitalism Nature Socialism*, *23*, 10–26

Gibson, Mark. (2012). "Food Security – A Commentary: What Is It and Why Is It So Complicated." *Foods*, *1*, 18-27.

Gomez, Oscar A. & Des, Gasper. (2013). *Human Security: A Thematic Guidance Note for Regional and National Human Development Report Teams*. UNDP, http://hdr.undp.org/sites/default/files/human_security_guidance_note_r-nhdrs.pdf.

Grousset, Rene. (2010). *The Empire of the Steppes: A History of Central Asia*, Translated by Naomi Walford New Brunswick: Rutgers University Press.

Haw, Stephen G. (1990). *China: A Cultural History*. London: Batsford.

Heurtebise, Jean-Yves. (2017). "Sustainability and Ecological Civilization in the Age of the Anthropocene: An Epistemological Analysis of the Psychosocial and 'Culturalist' Interpretations of Global Environmental Risks." *Sustainability*, *9*(8), 1-17.

Hood, Marlowe. (2017). "China Takes Global Lead in Clean Energy: Report." *Phys.org*, https://phys.org/news/2017-01-china-global-energy.html.

Huan, Qingzhi. (2016). "Socialist Eco-Civilization and Social Ecological Transformation." *Capitalism Nature Socialism, 27*(2), 51-66.

ICA. *Global Water Security*. Intelligence Community Assessment, Office of the Director of National Intelligence of the United States, http://www.dni.gov/nic/ICA_Global%20Water%20Security.pdf.

IEA. (2017). "Renewables 2017." International Energy Agency, https://www.iea.org/publications/renewables2017/.

Ji, Zhaojin. (2003). *A History of Modern Shanghai Banking: The Rise and Decline of China's Finance Capitalism*. Armonk: NY: M. E. Sharpe, 2003.

Korten, David. (2017). "Ecological Civilization and the New Enlightenment." *Tikkun*, 17-23.

Krausmann, Fridolin., et al. (2013). "Global Human Appropriation of Net Primary Production Doubled in the 20th Century." *Proceedings of the National Academy of Science of the United States of America*, https://doi.org/10.1073/pnas.1211349110.

Lattimore, Owen. (1940). *Inner Asian Frontiers of China*. New York: American Geographical Society.

Lee, Harry F. & David, D. Zhang. (2013). "A Tale of Two Population Crises in Recent Chinese History." *Climate Change*, *116*, 285-308.

Li, Eva. (2016). "Symbol of China's Rural Democracy: Five Years of Struggle in Wukan Land Grab Protests," *South China Morning Post*, September 14, http://www.scmp.com/news/china/policies-politics/article/2019006/symbol-chinas-rural-democracy-five-years-struggle-wukan.

Li, Jingyuan. & Tongjin, Yang. (2015). *China's Eco-City Construction*. London: Springer.

Li, Tianchen. (2003). "Confucian Ethics and the Environment." *Culture Mandala: The Bulletin of the Centre for East-West Cultural and Economic Studies.*, *6*, 1-6.

Liu, Qin. (2016). "China's New Silk Road Could Expand Asia's Deserts." *The Diplomat*, http://thediplomat.com/2016/09/chinas-new-silk-road-could-expand-asias-deserts/.

Lu, Xingcheng. (2016). "Estimation of Health and Economic Costs of Air Pollution over the Pearl River Delta Region." *Science of the Total Environment*, 566-577, 134-143.

Magdoff, Fred. (2012). "Harmony and Ecological Civilization: Beyond the Capitalist Alienation of Nature." *Monthly Review*, https://monthly review.org/2012/06/01/harmony-and-ecological-civilization/.

Mei, Yi-Pao. (1934). *Mo-tse*, *The Neglected Rival of Confucius*. London: Arthur Probsthain.

Morrison, Roy. (1995). *Ecological Democracy*. Boston: South End Press.

Ng, Teddy. (2018). "China Scraps Levy on US Sorghum Imports Amid Trade War Talks." *South China Morning Post*, May 18, http://www. scmp.com/news/china/diplomacy-defence/article/2146693/china-scraps-us-sorghum-import-levy-amid-trade-war.

Niu, Shuping., et al. (2017). "Farming the World: China's Epic Race to Avoid a Food Crisis." *Bloomberg News*, May 22, https:// www.bloomberg.com/graphics/2017-feeding-china/.

Norse, David. & Xiaotang, Ju. (2015). "Environmental Costs of China's Food Security." *Agriculture*, *Ecosystems and Environment*, *209*, 5-14.

NTS Alert. (2010). "Land Grab and Its Discontents." NTS Alert, Consortium of Non-Traditional Security Studies, http://www.rsis.edu. sg/nts/HTML-Newsletter/alert/NTS-alert-may-1002.html.

Oswald, James P. F. (2014). "What Does Eco-Civilization Mean?" *The China Story*, September 4, https://www.thechinastory.org/2014/09/ what-does-eco-civilisation-mean/.

Pow, C. P. (2017). "Building a Harmonious Society Through Greening: Ecological Civilization and Aesthetic Governmentality in China." *Annals of the American Association of Geographers*, November, 1-20.

PRC. (2015). *Full Text: Integrated Reform Plan for Promoting Ecological Progress*. Beijing: Communist Party of China (CPC) Central Committee and the State Council, http://www.xinhuanet.com/english/ china/2015-09/21/c_134646023.htm.

PRC. (2016). *The 13th Five-Year Plan for Economic and Social Development of the People's Republic of China*, *2016-2012*. Beijing: Central Compilation & Translation Service, Central Committee of the Communist Party of China, http://en.ndrc.gov.cn/newsrelease/ 201612/P020161207645765233498.pdf.

Qi, Shaozhou. & Si, Cheng. (2018). "China's National Emissions Trading Scheme: Integrating Cap, Coverage and Allocation," *Climate Policy*, https://doi.org/10.1080/14693062.2017.1415198.

Sachs, Jeffrey. (2007). *Bursting at the Seams: Reith Lectures 2007*. BBC, http://www.bbc.co.uk/radio4/reith2007/.

Shouyi, Bai. Ed. (1982). *An Outline History of China*. Beijing: Foreign Languages Press.

Smith, Geoffrey. (2015). "Australia Just Stopped China Buying a Farm the Size of Kentucky." *Fortune*, http://fortune.com/2015/11/19/australia-just-stopped-china-buying-a-farm-the-size-of-kentucky/.

Squatriti, Paolo. (2010). "The Floods of 589 at the Beginning of the Middle Ages: An Italian Microhistory." *Speculum*, *85*, 799-826.

Statistica. (2018a). "China: Share of Exports in Gross Domestic Product (GDP) from 2006 to 2016." *The Statistics Portal*, https://www.statista.com/statistics/256591/share-of-chinas-exports-in-gross-domestic-product/.

Statistica. (2018b). "Degree of Urbanization in China from 2006 to 2016." *Statistics Portal*, https://www.statista.com/statistics/270162/urbanization-in-china/.

Tracy, Elana F., et al. (2017). "China's New Eurasian Ambitions: The Environmental Risks of the Silk Road Economic Belt." *Eurasian Geography and Economics*., *58*, 56-88.

Troop, Trish A., et al. (2017). "AgroCycle – Developing a Circular Economy in Agriculture." *Energy Procedia*, *123*, 76-80.

Tu, Weiming. (2004). "The Ecological Turn in New Confucian Humanism: Implications for China and the World." In *Toward A Global Community: New Perspectives on Confucian Humanism*, Edited by Martin Lu, Rosita Dellios, and R. James Ferguson, 1-30. Gold Coast, Australia: Centre for East-West Cultural and Economic Studies, Bond University and International Confucian Association.

Turner, Adair. (2018). "China's Green Opportunity." *Project Syndicate*, https://www.project-syndicate.org/commentary/china-low-carbon-energy-transition-by-adair-turner-2018-01.

UN. (2017). "Report of the Secretary General: Progress Towards the Sustainable Development Goals." Economic and Social Council, http://www.un.org/ga/search/view_doc.asp?symbol=E/2017/66&Lang=E.

UNEP. (2016). *Green is Gold: The Strategy and Actions of China's Ecological Civilization*. Geneva: United Nations Environment Program.

Unger, Jonathan., Ed. (1993). *Using the Past to Serve the Present: Historiography and Politics in Contemporary China*. Armonk, NY: East Gate.

Wang, Xiaofu. (2006). "Economic Prosperity and the Shift of the Economic Centre of Gravity to the South." In *The History of Chinese Civilization*, *Volume III: Sui and Tang to Mid-Ming Dynasties (581-1525)*, Edited by Xingpei Yuan, et al., 143-212. Cambridge: Cambridge University Press.

Watson, Burton. (1958). *Ssu-ma Ch'ien: Grand Historian of China*. New York: Columbia University Press, 1958.

Watts, Jonathan. (2011). "Provincial Tug-of-War Waters Down China's Yellow River Success Story." *The Guardian*, June 28, https://www.theguardian.com/environment/2011/jun/28/water-yellow-river-china.

Williams, Martin. (2012). " ~73 ka Toba Super-Eruption and its Impact: History of a Debate." *Quaternary International*, *258*, 19-29.

Wittfogel, Karl A. (1957). *Oriental Despotism: A Comparative Study of Total Power*. New Haven: Yale Uni. Press.

Wilts, Henning. (2016). *Germany on the Road to a Circular Economy?* Bonn: Friedrich Ebert Stiftung.

World Bank. (2018a). "China - Food Imports (% of merchandise imports)." The World Bank Group, https://data.worldbank.org/indicator/TM.VAL.FOOD.ZS.UN?contextual=default&end=2016&locations=CN&start=1994.

World Bank. (2018b). "Prevalence of Undernourishment (% of Population)." The World Bank Group, https://data.worldbank.org/indicator/SN.ITK.DEFC.ZS?locations=CN.

World Bank. (2018c). "Cereal Production (Metric Tons)." The World Bank Group, https://data.worldbank.org/indicator/AG.PRD.CREL.MT?locations=CN&view=chart.

Wright, Arthur F. Ed. (1953). *Studies in Chinese Thought*. Chicago: University of Chicago Press.

Xi, Jinping. (2015). "Video and Full Text of President Xi's New Year Address." *CCTV America*, December 31.

Xiang, Lanxin. (2003). *The Origins of the Boxer War: A Multinational Study*. London: Routledge.

Xinhuanet. (2015). "Highlight of Proposals in the 13th Five-Year Plan (2016-2020)," http://news.xinhuanet.com/english/photo/2015-11/04/c_134783513.htm.

Yan, Wenming., et al., Eds. (2012). *The History of Chinese Civilization: Volume I*, *Earliest Times—221 B.C.E.* Cambridge: Cambridge University Press.

Yao, Xinzhong. (2014). "The Value of the Confucian Eco-Perspective for Environmental Protection." In *Proceedings of the International Conference Commemorating the 2565th Anniversary of Confucius and the 5th Congress of the International Confucian Association*, Edited by The International Confucian Association et al., *4*, 2111–1120. Beijing: ICA.

Yost, Chad L., et al. (2018). "Subdecadal Phytolith and Charcoal Records from Lake Malawi, East Africa Imply Minimal Effects on Human Evolution from the ~74 ka Toba Supereruption" *Journal of Human Evolution*, *116*, 75-94.

Zhang, Bo., et al. (2017). "China's New Environmental Protection Regulatory Regime: Effects and Gaps." *Journal of Environmental Management*., *187*, 464-469.

Zhang, Hongzhou. (2016). "Food Security in China: Whither the Self-Sufficiency Policy?" *RSIS Commentaries C016126*, https://www.rsis.edu.sg/rsis-publication/rsis/co16126-food-security-in-china-whither-the-self-sufficiency-policy/#.WwS6Ke6FNhE.

Zhou, Yang., et al. (2018). "Targeted Poverty Alleviation and Land Policy Innovation: Some Practice and Policy Implications from China." *Land Use Policy*, *74*, 53-65.